

A review of the genus *Glaresis* Erichson (Coleoptera: Trogidae) of subsaharan Africa

by

C. H. SCHOLTZ

Department of Entomology, University of Pretoria, Pretoria 0002

Fifteen species of *Glaresis* have been recorded from subsaharan Africa, 11 of which are new. The new species *G. celiae*, *G. desperata*, *G. exasperata*, *G. foveolata*, *G. frustrata*, *G. holmi*, *G. longisternum*, *G. minuta*, *G. namibensis*, *G. penrithae* and *G. walzlae*, are described and a key to the known species provided.

The genus *Glaresis* Erichson (Fig. 1) has been recorded on all the major continents with the exception of Australia but it seems likely that its absence there reflects the dearth of material in collections rather than the actual distribution. The trogids are considered to be amongst the most primitive scarabaeoids (Crowson 1967) and if the world distribution of the large cosmopolitan genus *Trox* F. is any indication, there appears to be no historical or zoogeographical reason for the absence of *Glaresis* in Australia.

In spite of its wide distribution, *Glaresis* has received little attention and only 43 species have been described to date (Paulian 1980, 1981; Scholtz 1982). *Glaresis* was first recorded in subsaharan Africa by the description of a single species from Somalia (Müller 1942). Subsequently only two papers on subsaharan elements have been published, in which three species were described (Petrovitz 1965, 1968).

Very little is known of the biology of *Glaresis* and all study material has been taken at light. Baker (1968) tried unsuccessfully to establish a laboratory culture of light trapped specimens but none of the foods, known to be eaten by different species of *Trox* (Coleoptera: Trogidae) were acceptable to them. Most species have been collected in sandy or desert areas.

All species have broad, spatulate legs and the ability to retract all the appendages. In the retracted position the ventral side is covered by the legs. Certain species have grooves (mesotibial fossae) in the metasternum into which the mesotibia are hooked when the legs are retracted. The evolutionary significance of this groove is not clear but it appears that the group is fossorial and the meso-legs, which are not used for digging, are retracted into the grooves during burrowing. Alternately, the species may be associated with ants as the presence of mesotibial fossae amongst myrmecophilous beetles is common.

All known subsaharan species were described from a few specimens and since a reasonable amount of material was available to me, I considered it worthwhile to review the subsaharan elements of the genus. Approximately 400 specimens representing 14 species, of which 11 are new, were examined.

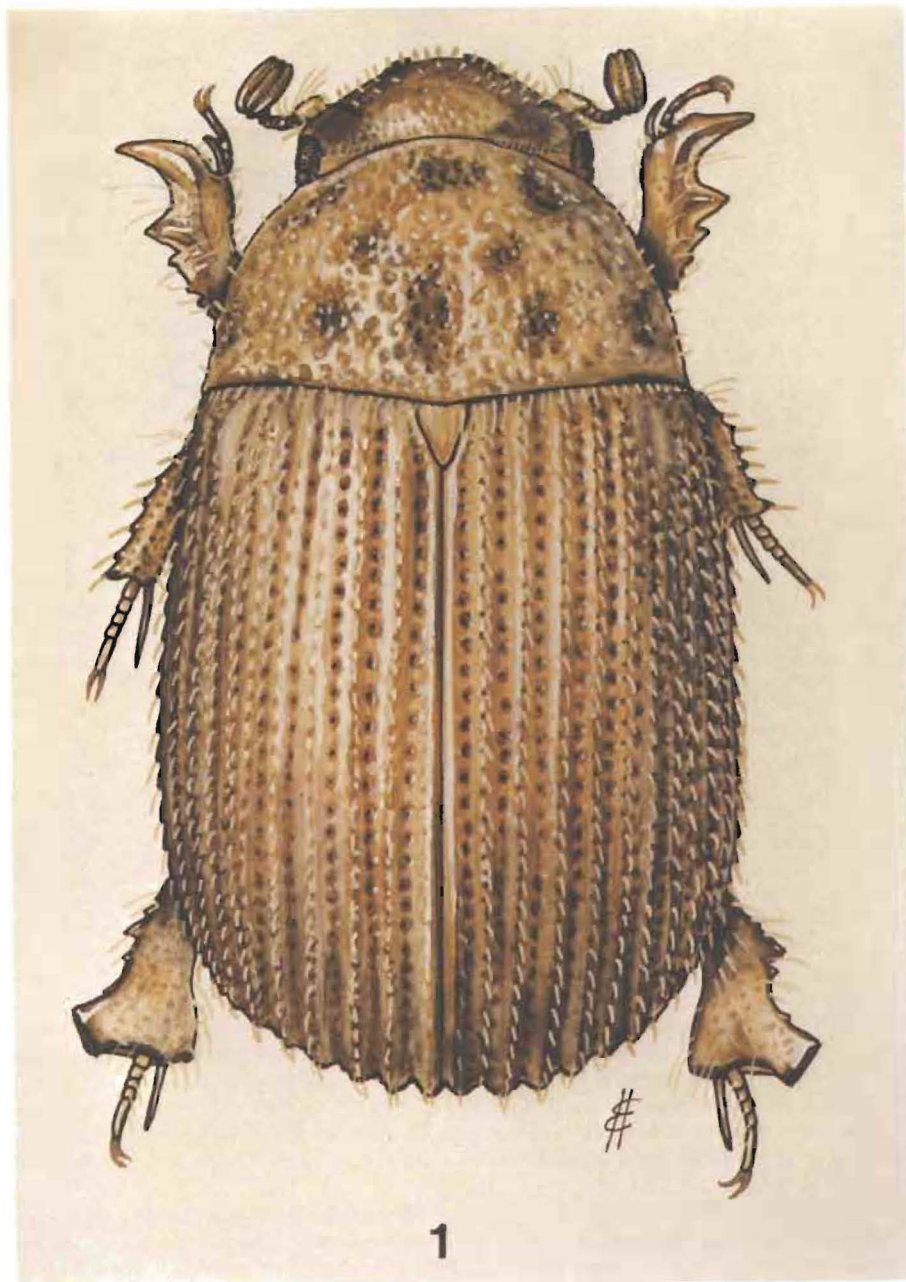


Fig. 1. *Glaresis impressicollis* Petrovitz.

This revision of *Glaresis* is the last in a series of studies on the taxonomy of African trogids, both *Trox* (Scholtz 1980, 1982, 1983) and *Glaresis* now having been dealt with.

The abbreviations used in the text refer to the institutions where the material is deposited:

BM	—	British Museum (Natural History), London
BREM	—	Private Collection of Professor H. J. Bremer, Kattowitzstr. 6, D-4000, Düsseldorf 1, West Germany
NCI	—	National Collection of Insects, Pretoria
NM	—	National Museum, Bloemfontein
PM	—	Muséum National d'Histoire Naturelle, Paris
SM	—	State Museum, Windhoek
SWIT	—	Muséum d'Histoire Naturelle, Geneva
TERV	—	Musée Royal l'Afrique Centrale, Tervuren
TM	—	Transvaal Museum, Pretoria
UP	—	Department of Entomology, University of Pretoria, Pretoria

Genus *Glaresis* Erichson Fig. 1

Only the literature relating to the subsaharan species of *Glaresis* is cited. References to the world literature are given by Scholtz (1982).

Glaresis Erichson, 1848: 925; Petrovitz 1968: 258.

Type-species *Glaresis rufa* Erichson (by original monotypy).

Light buff to dark brown in colour, 2,3–5,5 mm long.

Head: Deflexed; antennae 10-segmented; club with first segment large; eyes half divided by genae.

Thorax: Wings present, with M-Cu loop (Fig. 2). Metasternum long; elytral costae distinct; intercostae sometimes with prominent punctures.

Legs: Meta-femora and meta-tibiae enlarged to cover abdomen in retracted position.

Abdomen: With five free sternites; pygidium concealed by elytra.

Male genitalia: Typical, simple trilobate type, with simple parameres and median lobe and with pars basalis fused dorsally (Fig. 3).



Figs 2–3. *Glaresis impressicollis* Petrovitz. 2. Wing 3. Aedeagus.

CHARACTERS OF THE SPECIES OF *GLARESIS*

The male genitalia, which are the organs most useful for species identification in *Trox*, are virtually useless for identifying species of *Glaresis*. There are no discernible external differences between the sexes.

The following characters are the most useful for distinguishing between different species:

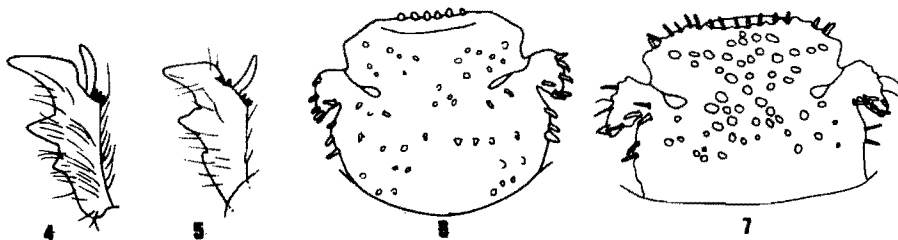
Protibia. Three basic types occur: (i) three large teeth with the distal tooth further from the median tooth than the latter is from the proximal tooth e.g. *G. walzlae* spec. nov. (Fig. 4); (ii) two large teeth and one small one, the latter at the base of the large median tooth e.g. *G. impressicollis* Petrovitz (Fig. 5); (iii) three distinct, evenly spaced teeth e.g. *G. koenigsbaueri* Petrovitz.

Mesotibia. The shape, dentation and number of spines differ (Figs 8–18): (i) evenly curved with regularly spaced spines over full curve, with large, pointed, distal projection e.g. *G. walzlae*; (ii) evenly curved with regularly spaced spines over full length of curve, distal point broad, rounded e.g. *G. impressicollis*; (iii) acutely curved with spines for proximal half of curve only, distal point broad, rounded e.g. *G. holmi* spec. nov.

Metatibia. The size, shape and position of the lateral tooth and relative width of two apical structures (the outer horseshoe-shaped structure and the inner spur-bearing part) are characteristic (Figs 19–32).

Metasternum. The degree of development of the mesotibial fossa falls into the following four categories: (i) broad, deep fossa and sharply ridged sternal sutures e.g. *G. methneri* Petrovitz; (ii) narrow, shallower but distinct fossa e.g. *G. impressicollis*; (iii) narrow, shallow, barely discernible fossa e.g. *G. koenigsbaueri*; (iv) no sign of fossa or associated sutures e.g. *G. walzlae*. The ratio of the length: width of the metasternal plate (the raised area bordered by the meso- and metacoxae and the mesotibial fossae) also differs between species.

Head: The anterior margin of the clypeus is either: (i) slightly concave with sharp antero-lateral corners e.g. *G. koenigsbaueri* (Fig. 6); (ii) more concave with rounded antero-lateral corners e.g. *G. impressicollis* (iii) irregular with small, acute antero-lateral angles e.g. *G. walzlae* (Fig. 7).



Figs 4–7. 4. *Glaresis koenigsbaueri* Petrovitz, protibia. 5. *Glaresis impressicollis* Petrovitz, protibia. 6. *Glaresis koenigsbaueri*, head in dorsal view. 7. *Glaresis walzlae* spec. nov., head in dorsal view.

Key to the Subsaharan Species of *Glaresis*

- 1 Protibia with three prominent teeth (Fig. 4) 2
- Protibia with two large teeth and one small one, at base of proximal tooth (Fig. 5) 9
- 2 Anterior clypeal margin smooth (Fig. 6) 5
- Anterior clypeal margin irregular (Fig. 7) 3
- 3 Northern species (N of 0°) 4
- Southern species (S of 0°) **namibensis**
- 4 Mesotibia with small median projection and row of 7–9 spines ending near base of acute projection, metatibia with prominent median projection on outer margin, with distinct median ridge (Fig. 8) **walzlai**
- Mesotibia with prominent median projection and row of 5 spines ending near base of sub-acute projection on outer margin, with faint median ridge (Fig. 9) **celiae**
- 5 Metasternum with visible mesotibial fossa 6
- Metasternum without mesotibial fossa **holmi**
- 6 Mesotibial fossa distinct – small species **minuta**
- Mesotibial fossa faint – larger species 7
- 7 Mesotibia with row of 5–7 spines stretching from median projection to base of apical projection; length to width ratio of metasternum 1:2 **koenigsbaueri**
- Mesotibia with row of 4 spines stretching from median projection to halfway between the latter and the apical projection; length to width ratio of metasternum 3:4 8
- 8 Metatibia with prominent projection on outer margin and prominent projection on inner ridge; colour red-brown **longisternum**
- Metatibia with small median projection on outer margin and small median projection on inner ridge; colour yellow-brown **penrithae**
- 9 Frons and pronotum with circular punctures with tubercle in the centre; metasternum with broad, deep mesotibial fossa bordered by sharp ridge **methneri**
- Frons and pronotum tuberculate, punctate or setose, punctures without central tubercle; metasternum with distinct mesotibial fossa without sharply ridged borders 10
- 10 Elytral costae coalesced by transverse ridges which separate large intercostal foveae **foveolata**
- Elytral costae distinct ridges 11
- 11 Width of mesotibial fossa: distance between fossae ratio is 1:4 **impressicollis**
- Width of mesotibial fossa: distance between fossae greater than 1:5 12
- 12 Metasternal plate evenly rounded, glabrous **frustrata**
- Metasternal plate raised, sculptured or with central depression 13
- 13 Metatibia with large median projection on outer margin **exasperata**
- Metatibia with small median projection on outer margin **desperata**

Glaresis walzlai spec. nov., Figs 7, 8, 19 & 33

Brown in colour, 4.5–5.5 mm long by 2.2–3.1 mm wide.

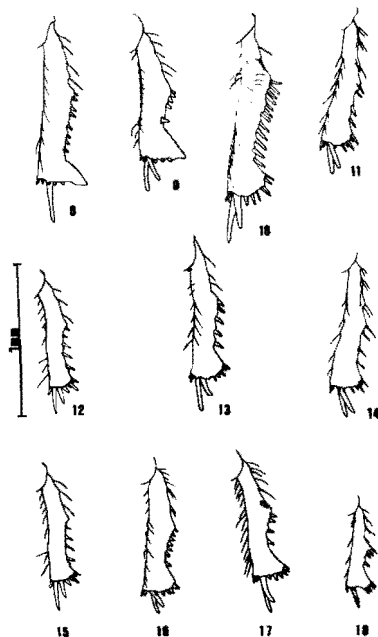
Head. Anterior clypeal margin slightly concave, irregular with sparse setae; frons irregularly tuberculate; genal projection posteriorly pointed.

Pronotum. Surface smoothly rounded, with irregular setae; sides parallel.

Elytra. Humeral calli prominent; costae distinct, sharp, narrow ridges with regularly-spaced setae; intercostae with faint punctures.

Underside. Metasternum narrow, much shorter than wide; mesotibial fossa obsolete.

Legs. Protibia with three prominent teeth, the distal tooth being further from the median tooth than the latter is from the proximal tooth; mesotibia slightly curved with row of 7–9 spines stretching from approximately the middle to the base of the



Figs 8–18. Mesotibiae of *Glareis* species. 8. *Glareis walzlae* spec. nov. 9. *Glareis celiae* spec. nov. 10. *Glareis namibensis* spec. nov. 11. *Glareis methneri* Petrovitz. 12. *Glareis foveolata* spec. nov. 13. *Glareis impressicollis* Petrovitz. 14. *Glareis frustrata* spec. nov. 15. *Glareis exasperata* spec. nov. 16. *Glareis koenigsbaueri* Petrovitz. 17. *Glareis holmi* spec. nov. 18. *Glareis minuta* spec. nov.

acute apical projection (Fig. 8); metatibia with irregular outer margin and prominent median projection; median ridge distinct and prominently dentate; apex with outer horseshoe shaped portion wider than inner spur-bearing portion (Fig. 19).

MATERIAL EXAMINED. Holotype, SUDAN: Prov. Darfur, Kutum 1140 m *ad lucem*, 4.ix.1976, H. J. Bremer (TM); 2 paratypes with same data as holotype (1 BREM, 1 UP); 14 paratypes, Prov. Darfur, El Fasher *ad lucem*, 4.ix.1976, H. J. Bremer (10 BREM, 1 BM, 1 SM, 1 TM, 1 UP); 8 paratypes, Prov. North Darfur, El Geneina *ad lucem*, 20.ix.1979, Ibrahim M. Abuzinid (5 BREM, 3 UP). NIGER: 3 paratypes, Rég. de Zinder, Sultanat du Damaghèrim Dungass, 1910, R. Gaillard (PM); 2 paratypes, Rég. de Zinder, de Maradi a Dungass, 1910, R. Gaillard (PM). CHAD: 37 paratypes, N'Gouri distr. de Kanem, ix.1958, P. Renaud (30 TERV, 7 UP).

Glareis walzlae is similar to *G. celiae* spec. nov. (see below) but can easily be distinguished from the latter by the shape of the meso- and metatibia. In *G. walzlae* the mesotibia is slightly curved with a row of 7–9 spines ending near the base of an acute

projection whereas in *G. celiae* there is a prominent projection in the middle with a row of five spines ending at the base of a subacute projection. The metatibiae differ in that *G. walzlae* has a prominent median projection on the outer margin and a distinct inner ridge whereas *G. celiae* has a smaller projection on the outer margin and a faint inner ridge. *Glaresis walzlae* is also superficially similar to the Palaearctic species, *G. carthagensis* Petrovitz. However, it can easily be distinguished from the latter by the shape of the mesotibia which has an acute apical projection in *G. walzlae* and a rounded apex in *G. carthagensis*.

This new species is named for Martie Walzl for her enduring patience with the typing of manuscripts.

***Glaresis celiae* spec. nov.** Figs 9, 20 & 33

Dark brown in colour, 4.2 mm long by 2.1 mm wide.

Head. Anterior clypeal margin slightly concave; irregular with sparse setae; frons irregularly tuberculate; genal projections posteriorly pointed.

Pronotum. Surface with irregular setae; median depression faint; sides slightly attenuated forward.

Elytra. Humeral calli prominent; costae distinct with low, narrow ridges and regularly spaced setae; intercostal punctures distinct, rounded.

Underside. Metasternum shorter than wide; mesotibial fossa distinct.

Legs. Protibia with three prominent teeth, the distal tooth being further from the median tooth than the latter is from the proximal tooth; mesotibia with prominent median projection on outer margin with a row of five spines ending before the start of the subacute distal projection (Fig. 9); metatibia with slightly irregular outside margin and distinct median projection; inner ridge faint; apex with inner spur-bearing part broader than horseshoe-shaped structure (Fig. 20).

MATERIAL EXAMINED. Holotype, ETHIOPIA: Abyssinie, A. Raffray (Coll. V. de Poll) (PM).

This species is similar to *Glaresis walzlae* but can be distinguished from the latter by the presence of a distinct mesotibial fossa on the metasternum. The fossa is obsolete in *G. walzlae*. They can further be separated by the characters discussed above.

This new species is named for Celia Kok who produced most of the illustrations used in this paper.

***Glaresis namibensis* spec. nov.**, Figs 10, 21 & 33

Brown in colour, 4.5 mm long by 2.2 mm wide.

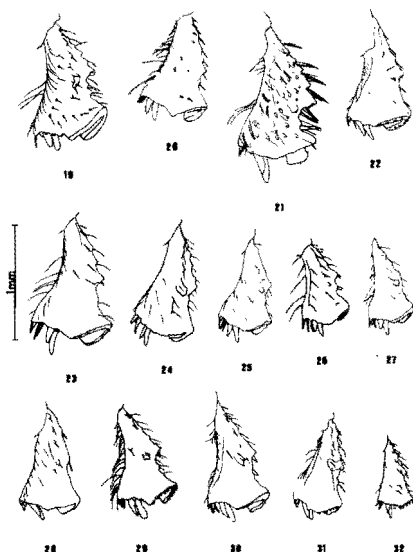
Head. Anterior clypeal margin slightly concave and dentate; frons tuberculate and pitted; genal projections almost round, slightly pointed posteriorly.

Pronotum. Surface pitted, with regular setae; median depression shallow; posterior margin dentate.

Elytra. Humeral calli prominent; costae distinct, narrow, not raised; intercostae broad, with large, shallow punctures.

Underside. Metasternum shorter than wide; mesotibial fossa obsolete.

Legs. Protibia with three prominent teeth, the distal tooth being further from the median tooth than the latter is from the proximal tooth; mesotibia with prominent



Figs 19–32. Metatibiae of *Glaresis* species. 19. *Glaresis walzlae* spec. nov. 20. *Glaresis celia* spec. nov. 21. *Glaresis namibensis* spec. nov. 22. *Glaresis methneri* Petrovitz. 23. *Glaresis foveolata* spec. nov. 24. *Glaresis impressicollis* Petrovitz. 25. *Glaresis frustrata* spec. nov. 26. *Glaresis exasperata* spec. nov. 27. *Glaresis desperata* spec. nov. 28. *Glaresis koenigsbaueri* Petrovitz. 29. *Glaresis holmi* spec. nov. 30. *Glaresis longisternum* spec. nov. 31. *Glaresis penrithae* spec. nov. 32. *Glaresis minuta* spec. nov.

projection approximately one-third of the way down, curved, with a row of 12 spines ending at the base of the rounded distal projection (Fig. 10); metatibia with large median projection, acutely curved between projection and apex; with prominent inner, tuberculate ridge and prominent median projection; apex with horseshoe-shaped structure divided into two distinct lobes, (Fig. 21).

MATERIAL EXAMINED. Holotype, NAMIBIA. Namib, Gobabeb, 23° 34' S, 15° 03' E, 6.ix.1974, E–Y: 361 at light, leg. Endrödy-Younga (TM).

This very characteristic new species is most similar to *G. walzlae*. However, the two species have very different metatibiae.

Glaresis methneri Petrovitz, Figs 11, 22 & 33

***Glaresis methneri* Petrovitz, 1965: 158**

Yellow-brown to brown in colour, 3.4–4.2 mm long by 1.8–2.1 mm wide.

Head. Anterior clypeal margin distinctly concave, lateral angles rounded; genal projections slightly pointed posteriorly; frons tuberculate and punctate, each tubercle centred in a distinct circular puncture.

Pronotum. Surface distinctly punctured with tubercles in the centre of most larger punctures; tubercles with single seta; median depression, anterior depression parallel to rim, and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct broad bands, raised and rounded, with regular isolated setae; intercostae with large, square punctures separated by narrow bands linking adjoining costae.

Underside. Metasternal plate raised, approximately as long as wide; mesotibial fossa deep with prominent, raised, lateral ridges.

Legs. Protibia with two large teeth and one small one at the base of the large proximal tooth; mesotibia with median projection and row of 3–4 widely spaced spines stretching from the former to just short of the apex (Fig. 11); metatibia with large projection on outer margin; inner ridge distinct, with large median projection, in some cases fused to outer median projection to form a transverse ridge; apex divided approximately equally (Fig. 22).

MATERIAL EXAMINED. ANGOLA: Benguela Capelongo-Dongo, Mission Rohan-Chabot 1914 (4 ex. PM, 1 UP). ZAIRE: Lualaba Kamina, 1950, Dr. Buls (1 ex. TERV). TANZANIA: Narobi b. Tanga, iii.1915, leg. Methner (2 paratypes SWIT); Trockenwald bei Mtotohovu, ii.1915, leg. Methner (2 paratypes SWIT).

Glaresis methneri is most similar to *G. foveolata* from which it can easily be distinguished. The former has the mesotibial fossa in the metasternum bordered by sharp, raised ridges whereas *G. foveolata* has the mesotibial fossa a rounded depression without ridges.

***Glaresis foveolata* spec. nov., Figs 12, 23 & 34.**

Red-brown in colour, 4.2–4.5 mm long by 2.0–2.2 mm wide.

Head. Anterior clypeal margin distinctly concave, lateral angles rounded; genal projections pointed posteriorly, margins with long setae; frons punctate, lateral margins with long setae.

Pronotum. Surface sculptured, punctate and setose; median depression, anterior depression parallel to rim, and lateral foveae distinct; posterior rim with fringe of long setae.

Elytra. Humeral calli prominent; costae distinct, narrow, setose ridges coalesced by narrow, transverse ridges which separate the large, round intercostal foveae.

Underside. Metasternal plate raised, rugose, with small setose tubercles; mesotibial fossa deep and narrow, sides parallel; width of fossa to distance between fossae 1:4.

Legs. Protibia with two large teeth and one small one at the base of the large proximal tooth; mesotibia with median projection and row of five widely-spaced spines stretching from the former to the apex (Fig. 12), metatibia with large projection on outer margin; inner ridge faint but median projection prominent, partially fused to outer median projection; apex divided equally (Fig. 23).

MATERIAL EXAMINED. Holotype, SOUTH AFRICA: Pretoria-East, xi.1961, C. Koch (TM); 1 paratype with same data as holotype (UP); 1 paratype, Pretoria N., 26.1.1954, D. W. Rorke (TM).

This new species is similar to *G. methneri* and large specimens of *G. impressicollis* Petrovitz. However, it can be distinguished from the former by the structure of the mesotibial fossa and from the latter by the shape of the costal ridges on the elytra. The mesotibial fossa in *G. methneri* is bordered by sharp, raised ridges whereas in *G. foveolata* the fossa is merely a depression in the metasternum. *Glaresis foveolata* has large intercostal foveae and fused elytral costae whereas *G. impressicollis* has distinct costal ridges with smaller intercostal punctures.

Glaresis impressicollis Petrovitz, Figs 1, 5, 13, 24 & 33.

Glaresis impressicollis Petrovitz, 1965: 157

Yellow-brown to dark brown in colour, 3.5–5.5 mm long by 1.7–2.8 mm wide.

Head. Anterior clypeal margin concave; frons tuberculate.

Pronotum. Surface sculptured; median depression, anterior depression parallel to rim, and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct, setose ridges; intercostae with small to large punctures.

Underside. Metasternal plate raised; mesotibial fossa attenuated from the top, broad, shallow; width of fossa to distance between fossae, 1:4.

Legs. Protibia with two large teeth and one small one at the base of the large proximal tooth; mesotibia slightly curved with distinct median projection and row of 4–6 spines stretching from the former to the apex (Fig. 13). Metatibia with prominent median projection on outer margin and distinct inner ridges with prominent median projection, the latter sometimes fused to outer tooth to form a transverse ridge (Fig. 24).

MATERIAL EXAMINED. ZIMBABWE: Wankie Nat. Park, 5.xi.1961, J. S. Weir (1 ex. BM). MOZAMBIQUE: Zambeze, Nova Choupanga, P. Lesne, 1929 (1 ex. PM). BOTSWANA: 26 miles N Tshabong, SE 25 22 Cb, J. F. Barker (2 ex. NCI); 40 km N Tshane, 11.i.1973, E. Holm (1 ex. NCI); 35 km S Kang, SE 23 22 Db, 23.i.1978, Holm, Jacobs, Kirsten & Scholtz (1 ex. UP); R. Thamalakane 7 miles NE Maun, 20.iv.1972 (1 ex. BM); Kuke Pan 20° 59' S, 22° 25' E, 14–15.iv.1972 (8 ex. BM). NAMIBIA: Omega, W. Caprivi, 18° 03' S, 22° 11' E, 12–13 and 16–19.xi.1979, M-L. Penrith, C. G. Coetzee, C. Scholtz (1 ex. SM); 80 km W Rundu, Okavango SE 17 19 Cc, 2.iii.1973 (1 ex. SM); Okahandja Townlands, SE 21 17 Cc, 4–19.iv.1976 (1 ex. SM); Uithou 366, 22° 52' S, 19° 46' E Gobabis, 24–26.i.1975 (2 ex. SM); Wildheim Ost 384, SE 26 19 Bc, Keetmanshoop, 17–25.iv.1977, S. Louw, M-L. Penrith (1 ex. SM); Oshikango Owambo, 17° 23' S, 15° 53' E, 12.xi.1974 (21 ex. SM); Mukorob 14 Namaland, SE 25 18 Ac, 12–14.iv.1974 (13 ex. SM); Oostenwald 21° 52' S, 19° 58' E Gobabis, 27–28.i.1975 (9 ex. SM); Omega W. Caprivi, 18° 03' S, 22° 11' E, 17.xi.1979, C. H. Scholtz (26 ex. UP). SOUTH AFRICA: TRANSVAAL: 32 miles SW Louis Trichardt, 2.iii.1967 (1 ex. NCI); Nylsvley Naboomspruit, SE 24 28 Da, S.E.R.P., xi.1977 (1 ex. UP); Naboomspruit, 8.i.1927, G. van Son (9 ex. TM); Rhenosterpoort, NE Bronkhorstsp., 15–17.xii.1972, L. Schulze (2 ex. UP). NATAL: Dukuduku, i.1978, G. L. Prinsloo & L. v. Luik (1 ex. NCI); Lake Kosi, i.1978, G. L. Prinsloo & L. v. Luik (1 ex. NCI). CAPE PROVINCE: Twee Rivieren, SE 26 20 Bc, 3.iii.1980, S. Louw, M-L. Penrith (1 ex. SM); Twee Rivieren, ii.1966, Coetzee (1 ex. TM); Vanzylsrus SE 26 22

Cc, 2-3.iii.1980, S. Louw, M-L. Penrith (1 ex. SM); Joenus SE 25 23 Dd, 26-27.ii.1980, S. Louw, M-L. Penrith (1 ex. SM). ORANGE FREE STATE: Sophiasdal 280, Hoopstad SE 27 25 Dc/d, 4.iii.1978, A. Strydom (13 ex. NM); Sasolburg, Mullersrus Plot 12, 24.xii.1982, D. M. Kroon (66 ex. TM).

Glaresis impressicollis is similar to *G. foveolata* and to *G. exasperata*, *G. frustrata* and *G. desperata*. However, it can be distinguished from *G. foveolata* by the shape of the elytral costae (see above). It can be distinguished from *G. exasperata*, *G. frustrata* and *G. desperata* by the ratio of the width of the mesotibial fossa to the distance between the fossae. In *G. impressicollis* the ratio is 1:4 whereas in the other three species it is greater than 1:4.

***Glaresis frustrata* spec. nov., Figs 14, 25 & 34.**

Brown in colour, 3.2-3.7 mm long by 1.6-1.8 mm wide.

Head. Anterior clypeal margin nearly straight, lateral angles rounded; genal projections slightly pointed anteriorly and posteriorly, margins setose; frons tuberculate.

Pronotum. Surface sculptured; median depression and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct, setose ridges; intercostae wide, with small to large punctures.

Underside. Metasternal plate evenly rounded, glabrous; mesotibial fossa deep, narrow, sides parallel; width of fossa to distance between fossae 1:9.

Legs. Protibia with two large teeth and one small one at the base of the large proximal tooth; mesotibia slightly curved, with small median projection and row of four spines stretching from the former to the apex (Fig. 14); metatibia with large median projection on outer margin, inner ridge prominent and median projection large; apex with horseshoe-shaped portion wider than spur-bearing part (Fig. 25).

MATERIAL EXAMINED. Holotype, SOUTH AFRICA: Mata Mata, Kalahari Gemsbok Park, x.1957, C. Koch (TM); 15 paratypes with same data as holotype (1 BM, 1 NCI, 1 SM, 11 TM, 1 UP).

This new species is similar to *G. exasperata* and *G. desperata* but can be distinguished from the former by the surface of the metasternal plate and from the latter by the size of the median projection on the outer margin of the metatibia. In *G. frustrata* the metasternal plate is evenly rounded and glabrous, in *G. exasperata* it is raised with a central depression. *Glaresis desperata* has a small median projection on the outer margin of the metatibia and *G. frustrata* a large median projection on the metatibia.

***Glaresis exasperata* spec. nov., Figs 15, 26 & 34**

Pale brown in colour, 2.8-3.5 mm long by 1.5-1.8 mm wide.

Head. Anterior clypeal margin nearly straight, lateral angles rounded; genal projections pointed slightly posteriorly; frons with isolated small tubersles.

Pronotum. Surface setose; median depression and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct setose ridges; intercostae with large, shallow punctures.

Underside. Metasternal plate raised, with slight central depression; mesotibial fossa distinct, narrow, sides parallel; width of fossa to distance between fossae ratio is 1:7.

Legs. Protibia with two large teeth and one small one at the base of the large proximal tooth. Mesotibia slightly curved, with small median projection and row of four spines stretching from the former to the apex (Fig. 15). Metatibia with large projection on outer margin; inner ridge faint but median projection prominent; apex divided approximately equally (Fig. 26).

MATERIAL EXAMINED. Holotype, SOUTH AFRICA: Joenus N.W. Cape, SE 25 23 Dd, 26–27.ii.1980, S. Louw, M-L. Penrith (H 41362) (SM); 4 paratypes with same data as holotype (2 SM, 1 TM, 1 UP); 1 paratype, Vanzylsrus N.W. Cape, SE 26 22 Cc, 2–3.iii.1980, S. Louw, M-L. Penrith (H 41808) (SM); 1 paratype, NAMIBIA: Haruchas 156 Mariental, SE 24 28 Dd, 19–20.ii.1980, S. Louw, M-L. Penrith (H 40648) (SM).

This new species is similar to *G. frustrata* but can be distinguished from the latter by the surface and shape of the metasternal plate as discussed under *G. frustrata*.

***Glaresis desperata* spec. nov., Figs 27 & 34**

Dark brown in colour, 3.3–3.5 mm long by 1.6–1.7 mm wide.

Head. Anterior clypeal margin slightly concave, lateral angles rounded; genal projections sharply pointed posteriorly, margins setose; frons finely punctate.

Pronotum. Surface sculptured; median depression, anterior depression parallel to rim, and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct, broad bands as wide as intercostae, with evenly-spaced single setae; intercostae with small, deep punctures.

Underside. Metasternal plate raised, sculptured; mesotibial fossa deep, sides parallel; width of fossa to distance between fossae 1:5.

Legs. Protibia with two large teeth and one small one at the base of the large proximal tooth; mesotibia slightly curved with small median projection and row of four spines stretching from the former to the apex as in *G. exasperata* (Fig. 15); metatibia with small median projection on outer margin; inner ridge faint, with small median projection; apex divided approximately equally (Fig. 27).

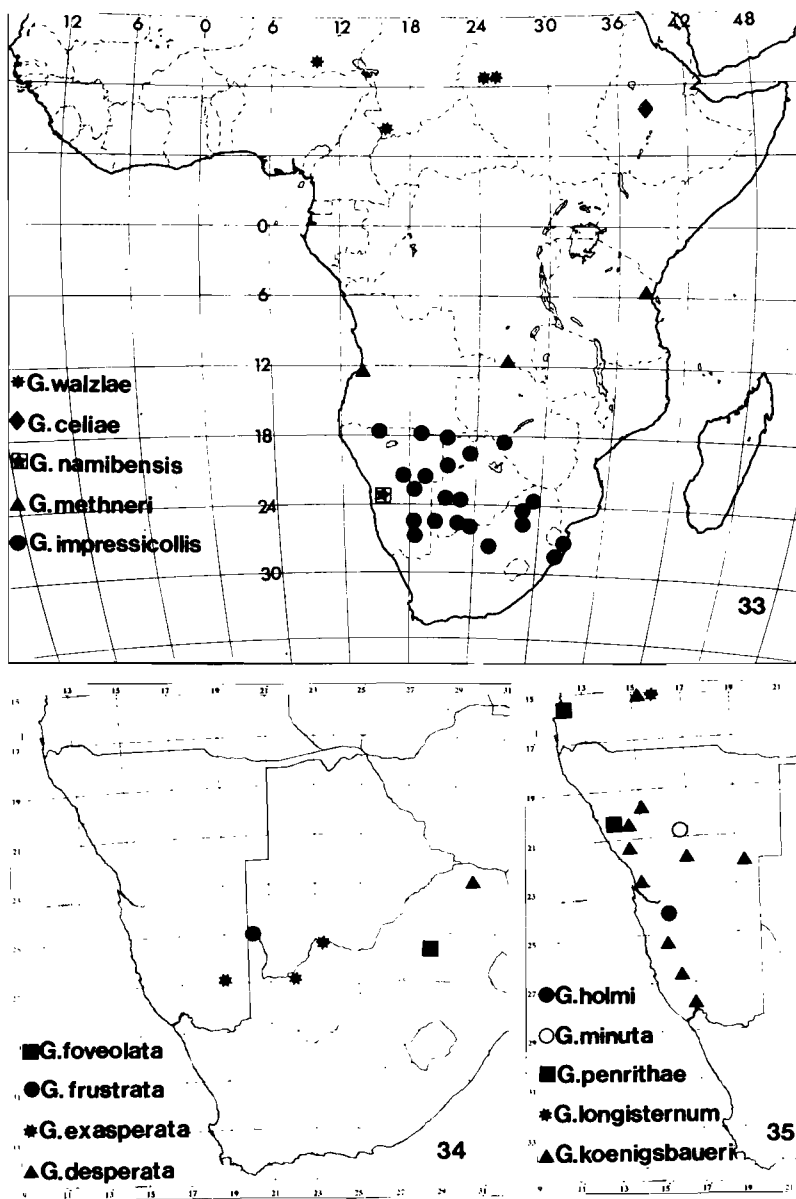
MATERIAL EXAMINED. Holotype, SOUTH AFRICA: N. Transvaal, Soutpansberg – N 22°54' S, 29°41' E, 13.iii.1973, E–Y: 45 mercury vap. light, leg. Endrödy-Younga (TM); 3 paratypes with same data as holotype (2 TM, 1 UP).

Glaresis desperata is similar to *G. frustrata* but can be separated from the latter as discussed above under *G. frustrata*.

***Glaresis koenigsbaueri* Petrovitz, Figs 4, 6, 16, 28 & 35**

***Glaresis koenigsbaueri* Petrovitz, 1968: 269.**

Red brown in colour, 3.5–4.5 mm long by 2.0–2.2 mm wide.



Figs 33–35 Distribution of *Glaresis* species. 33. *Glaresis walzlae* spec. nov., *G. celiae* spec. nov., *G. namibensis* spec. nov., *G. methneri* Petrovitz and *G. impressicollis* Petrovitz. 34. *Glaresis foveolata* spec. nov., *G. frustrata* spec. nov. *G. exasperata* spec. nov. and *G. desperata* spec. nov. 35. *Glaresis koenigsbaueri* Petrovitz, *G. holmi* spec. nov., *G. longisternum* spec. nov., *G. penrithae* spec. nov. and *G. minuta* spec. nov.

Head. Anterior clypeal margin nearly straight, lateral angles acute; frons tuberculate; genal projections slightly pointed posteriorly.

Pronotum. Surface tuberculate, without setae; median depression and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct ridges approximately as wide as intercostae, with small, regular tubercles, each with a single seta; intercostae with small, deep punctures.

Underside. Metasternum shorter than wide (1:2); mesotibial fossa barely discernible.

Legs. Protibia with three distinct, evenly-spaced teeth; mesotibia with median projection and row of 5-7 spines from the former to base of apical projection (Fig. 16); metatibia with slight to prominent projection on outer margin and small inner projection; apex approximately equally divided (Fig. 28).

MATERIAL EXAMINED. ANGOLA: Rio Bero, Moçamedes SE 15 12 Aa, 11 May 1974 (3 ex. SM). NAMIBIA: 1 paratype, Otjitambi 1050 m, 11.1965, leg. Koenigsbauer (SWIT); Bethanis 514, Outjo SE 20 14 Ad, 9-10.iv.1973 (15 ex. SM); Namuskluft 88, SE 27 16 Dd, 7-15.x.1970 (5 ex. SM); Good Hope 397, Gobabis SE 22 19 Ab, 22-24.v.1973 (1 ex. SM); Plateau 38/Aar 16, Lüderitz SE 26 16 Cb, 14-17.i.1972 (1 ex. SM); Gorrasis 99, SE 25 15 Bd Lüderitz, 25-31.i.1974 (1 ex. SM); Rössing Mts, Swakopmund SE 14 Db, 1-2.iii.1974 (1 ex. SM); Okahandja, 13-19.i.1928, R.E. Turner (1 ex. BM).

This species is most similar to *G. holmi* from which it can be distinguished as discussed below under *G. holmi*.

***Glaresis holmi* spec. nov., Figs 17, 29 & 35**

Yellow-brown in colour, 3.0-3.6 mm long by 1.7-1.9 mm wide.

Head. Anterior clypeal margin nearly straight; frons tuberculate; genal projections slightly pointed posteriorly.

Pronotum. Surface smooth; median depression, anterior depression parallel to rim, and lateral foveae distinct; posterior rim with fringe of setae.

Elytra. Humeral calli prominent; costae distinct ridges, approximately as wide as intercostae, slightly raised, without tubercles; intercostae with small, round punctures.

Underside. Metasternum shorter than wide (1:2); mesotibial fossa obsolete.

Legs. Protibia with three distinct, evenly-spaced teeth; mesotibia with median projection and row of four spines stretching from the former, halfway to the apex (Fig. 17); metatibia with dentate outer margin and large median projection; inner ridge dentate with large median tooth (Fig. 29).

MATERIAL EXAMINED. Holotype, NAMIBIA: W. Naukluft (in dunes), SE 24 15 Bb, vii.1981, E. Holm (TM); 5 paratypes with same data as holotype (1 BM, 1 SM, 3 UP).

Glaresis holmi is most similar to *G. koenigsbaueri* but can be distinguished from it by the smooth pronotal surface and the absence of mesotibial fossa. *Glaresis koenigsbaueri* has a tuberculate pronotal surface and a visible mesotibial fossa.

This new species is named for Professor Erik Holm who collected the type series and who has shown sustained interest in trogid collecting.

***Glaresis longisternum* spec. nov., Figs 30 & 35**

Red-brown in colour, 4.2 mm long by 2.2 mm wide.

Head. Anterior clypeal margin concave; frons tuberculate.

Pronotum. Surface pitted; sides parallel; median depression and lateral foveae distinct.

Elytra. Humeral calli prominent; costae distinct ridges approximately as wide as intercostae, with regularly-spaced setae; intercostae with small, deep punctures.

Underside. Metasternal plate long, length to width ratio 3:2; mesotibial fossa faint.

Legs. Protibia with three distinct, evenly-spaced teeth; mesotibia with prominent median projection and a row of four spines stretching from the latter to halfway between it and the apex as in *G. holmi* (Fig. 17); metatibia with prominent median projection on outer margin and prominent inner, median projection; horseshoe shaped structure comprises approximately two-thirds of the apex (Fig. 30).

MATERIAL EXAMINED. Holotype, ANGOLA: Rio Bero, Moçamedes SE 15 12 Aa, 11.v.1974 (SM); 2 paratypes with same data as holotype (1 SM, 1 UP).

This new species is similar to *G. penrithae* but can be distinguished from it by the length to width ratio of the metasternal plate, which is 1:1 in *G. penrithae* and 3:2 in *G. longisternum*.

***Glaresis penrithae* spec. nov., Figs 31 & 35**

Yellow-brown in colour, 3.5–4.2 mm long by 1.7–2 mm wide.

Head. Anterior clypeal margin slightly concave, angles obtuse; genal projections rounded to slightly pointed posteriorly; frons tuberculate.

Pronotum. Surface irregularly setose, median depression, anterior depression parallel to rim, and lateral foveae distinct; posterior rim with fringe of setae.

Elytra. Humeral calli prominent; costae distinct, broad bands with narrow elevated ridges and regular isolated setae; intercostae with small, deep punctures.

Underside. Metasternal plate raised, approximately as long as wide; mesotibial fossa faint.

Legs. Protibia with three distinct evenly-spaced teeth; mesotibia with median projection and row of four spines stretching from the former to halfway to the apex as in *G. minuta* (Fig. 18). Metatibia with small median projection on outer margin; inner ridge faint with small median projection; apex divided unequally, horseshoe-shaped portion wider than spur-bearing portion (Fig. 31).

MATERIAL EXAMINED. Holotype, NAMIBIA: Bethanis 514, Damaraland SE 20 14 Ad, 12–14.v.1978, S. Louw, M–L. Penrith (H 36092) (SM); 7 paratypes, Bethanis 514, Outjo SE 20 14 Ad, 8–10.v.1973 (1 NCI, 4 SM, 1 TM, 1 UP). ANGOLA: 3 paratypes, Pastoril do Sul, Moçamedes SE 15 12 Ba 8–10.v.1974 (2 SM, 1 UP).

Glaresis penrithae is similar to *G. longisternum* but can be distinguished from it by the length to width ratio of the metasternal plate (see above).

This new species is named for Dr Mary-Lou Penrith for unfailing enthusiasm in trogid collecting.

***Glaresis minuta* spec. nov.**, Figs 18, 32 & 35

Brown in colour, 3 mm long by 1.4 mm wide.

Head. Anterior clypeal margin nearly straight; frons with small tubercles; genal projections pointed posteriorly.

Pronotum. Surface irregularly setose; median depression, anterior depression parallel to rim, and lateral foveae deep; lateral margins and posterior rim with fringe of spatulate setae.

Elytra. Humeral calli prominent; costae distinct, broader than intercostae, with regular isolated setae; intercostae with small, deep punctures.

Underside. Metasternal plate raised, with central depression; length to width ratio, 2:3; mesotibial fossa distinct.

Legs. Protibia with three distinct, evenly-spaced teeth; mesotibia with median projection and row of four spines stretching from the former to halfway to the apex (Fig. 18); metatibia with small, median projection; inner ridge obsolete; apex divided approximately equally (Fig. 32).

MATERIAL EXAMINED. Holotype, NAMIBIA: Ike 346, Outjo SE 19 16 Da, 10–14.iii.1979, S. Louw, M-L. Penrith (H 38378) (SM); 2 paratypes with same data as holotype (1 SM, 1 UP).

This small species is closest to *G. koenigsbaueri* but is considerably smaller and has a distinct mesotibial fossa, whereas *G. koenigsbaueri* has the mesotibial fossa faint.

Incertae sedis

Glaresis lomii Müller

***Glaresis lomii* Müller**, 1942: 85; Petrovitz 1968: 261.

The type of this species, which was described from a single specimen from Somalia, could not be traced. It was not seen by Petrovitz (1968) either and the date of publication of the species (1942) was incorrectly quoted by him (1912 according to Petrovitz). The original description is poor and except for the size (2.3 mm long), no useful characters were given with which the species could be identified.

ACKNOWLEDGEMENTS

I am very grateful to the curators of the collections from which material was borrowed: BM – Mr M. E. Bacchus; BREM – Professor H. J. Bremer; NCI – Mr R. Oberprieler; NM – Mr S. Louw; PM – Dr A. Descarpentries; SM, – Dr M-L. Penrith; SWIT – Dr C. Besuchet; TERV – Dr J. Decelle and TM, – Dr S. Endrödy-Younga.

I would also like to thank Professor Erik Holm for the illustration used in Fig. 1; Celia Kok for Figs 4–32, Maria Lucas for technical assistance and Martie Walzl for typing the manuscript.

This study was funded by a grant from the S.A. Council for Scientific and Industrial Research and the University of Pretoria financed the publication of this paper.

REFERENCES

- BAKER, C. W. 1968. Larval taxonomy of the Troginae with notes on biologies and life histories. *Bulletin of the United States National Museum* **279**: 1–79.
- CROWSON, R. A. 1967. *The natural classification of the families of Coleoptera*. E. W. Classey, Middlesex.
- ERICHSON, W. F. 1848. Scaphidiidae – Scarabaeidae. *Naturgeschichte der Insecten Deutschlands*. Vol. 3. Nicolai, Berlin.
- MÜLLER, G. 1942. Nuovi Coleotteri dell'Africa Orientale. *Atti del Museo Civitas di Storia naturale Trieste* **15(3)**: 63–86.
- PAULIAN, R. 1980. Insects of Saudi Arabia. Coleoptera: Scarabaeoidea (1st contribution). In: Wittmer, W., Ed. *Fauna of Saudi Arabia*. Geneva.
- PAULIAN, R. 1981. Insectes coléoptères Trogidae et Hybosoridae. *Faune de Madagascar* **56**: 1–29.
- PETROVITZ, R. 1965. Zwei neue *Glareis* Arten aus Ost Afrika (Col. Scarab. Troginae). *Mitteilungen zoologisches Museum Berlin* **41**: 157–159.
- PETROVITZ, R. 1968. Die afrikanischen Arten der Gattung *Glareis* Erichson nebst einer mit dieser nahe-verwandten neuen Gattung. *Entomologische Arbeiten Museum Georg Frey* **19**: 257–271.
- SCHOLTZ, C. H. 1980. Monograph of the genus *Trox* F. (Coleoptera: Trogidae) of subsaharan Africa. *Cimbebasia Memoir* No. 4, 104 pp.
- SCHOLTZ, C. H. 1982. Catalogue of world Trogidae (Coleoptera: Scarabaeoidea). *Entomology Memoir, Department of Agriculture and Fisheries, Republic of South Africa* No. 54, 27 pp.
- SCHOLTZ, C. H. 1983. A new species of *Trox* F. (Coleoptera: Trogidae) from Senegal with new distributional records for other African species. *Journal of the Entomological Society of Southern Africa* **46**: 205–208.

Accepted 3 March 1983